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ABSTRACT

This miniproduct safety unit is designed as a flexible resource unit and has material for one or several class periods. It is intended to give students some basic information about flammable fabrics and government rules regulating them. There is also information about the new flame resistant materials and their care and maintenance. The unit includes teaching objectives, student readings, a question and answer activity, discussion questions, and class activities. (HD)

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PRODUCT SAFETY EDUCATION

U.S. CONSUMER PRODUCT SAFETY COMMISSION

FLAMMABLE FABRICS

NO.2-T DISTRIBUTIVE EDUCATION TEACHER'S GUIDE

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PURPOSE OF THE MATERIALS

This is a Mini Product Safety Unit on flammable fabrics designed by the U.S. Consumer Product Safety Commission for use in Distributive Education classes. Each year there are thousands of serious injuries from burns associated with flammable fabrics. The purpose of this unit is to give students some basic information about flammable fabrics and government rules regulating them. There is also information about the new flame resistant materials and their care and maintenance. Since so many products sold on the retail level are made from or covered by fabrics – clothing, carpets, mattresses, draperies, upholstered furniture – it is important for students, who may be involved with these products in sales or marketing, to have the latest information.

The unit includes teaching objectives, student readings, question and answer activity, discussion questions, class activities and a transparency master. It is designed as a flexible resource unit, and has material for one or several class periods. The student readings should be reproduced and distributed to the class.

THE U.S. CONSUMER PRODUCT SAFETY COMMISSION

Each year some 30,000 consumers are killed and 20 million injured in accidents in and around the home. Over 110,000 injuries result in permanent disability. Believing that something could and must be done to reduce this toll, Congress passed the Consumer Product Safety Act. It was signed into law by the President on October 27, 1972.

This Act established the U.S. Consumer Product Safety Commission (CPSC), an independent Federal regulatory agency, whose primary goal is to reduce injuries associated with consumer products. The Commission has broad authority to issue and enforce safety standards governing the design, construction, contents, performance, packaging and labeling of well over 10,000 consumer products – from architectural glass, stairs and power tools to stoves, ladders, lawn mowers and bicycles.

The Commission also regulates products covered by four Acts previously administered by other Federal agencies: the Flammable Fabrics Act, the Federal Hazardous Substances Act, the Poison Prevention Packaging Act, and the Refrigerator Safety Act.

The Commission can ban hazardous products and any consumer product which presents an imminent hazard of death, serious illness or severe injury is liable for immediate seizure under a court order. The Commission is also responsible for providing education and information to the public on product safety. For more information about the Consumer Product Safety Commission and the subjects it covers, write to: U.S. Consumer Product Safety Commission, Washington, D.C. 20207, or call the toll-free Hot Line: 800-638-2666; Maryland residents only, call 800-492-2937.

OBJECTIVES

The purposes of the unit are to:

1. Increase student awareness of fires involving clothing, upholstered furniture, mattresses and other flammable fabrics.
2. Provide students with basic information about fabric flammability, so that the students in their marketing and retailing roles will be able to help consumers in the selection, use and maintenance of these products.
3. Help students understand the Federal Government's role in the regulation of fabric flammability.
4. Encourage student discussion about business' role in product safety and product safety education.
5. Provide students with activities which will help them understand business, consumer and government interaction in the areas of flammable fabrics and product safety.

SUGGESTED ACTIVITIES

QUESTIONS AND ANSWERS – TRUE OR FALSE

This series of questions may be used in any of several ways:

1. As a review quiz after students have had a chance to complete the readings.
2. As a study guide to the readings. Give students a copy of the quiz and ask them to fill in the answers as they read through the material.
3. As a method for group review of the readings. After students have had a chance to complete the readings alone ask them to join groups of 5 or 6 students and as a group answer the questions. Be sure each student has a copy of the quiz on which to record the correct answers.

_____ 1. When working with flammable liquids like gasoline, kerosene or naptha, fire will not occur if sparks or the flame source do not touch the liquid.

_____ 2. Smoking is the most common cause of fires in bedding, matresses and upholstered furniture.

_____ 3. People who are involved in fires when fully clothed usually have less area burned and less severe burns because the clothing protects them from the heat of the fire.

_____ 4. The Federal Government has set flammability standards for carpets, rugs, mattresses and children's sleepwear sized 0-14.

_____ 5. A safety standard sets up minimum tests a product must pass in order to provide a specific level of protection.

_____ 6. Federal flammability standards are suggested guidelines for manufacturers to follow.

_____ 7. After the date a Federal flammability standard goes into effect (effective date) only products that meet the standard can be sold in retail stores.

_____ 8. Flame resistant means the same thing as flame proof.

_____ 9. All large carpets (over 24 sq. ft.) must be labeled to let consumers know the carpet meets the flammability standard.

_____ 10. A 3' x 3' carpet that cannot pass the flammability standard may be manufactured and sold.

_____ 11. The tests for the mattress flammability standard involve the use of a number of burning cigarettes placed on the mattress.

_____ 12. Children under 5 and teenagers are the most frequent fire victims and are usually the most seriously injured.

_____ 13. Children's sleepwear sizes 0-6x and 7-14 must meet the flammability standards set by CPSC, and so must fabric intended for use in sleepwear in these sizes.

_____ 14. Children's sleepwear sizes 0-6x must have a label indicating it meets the flammability standard.

_____ 15. Children's sleepwear sizes 7-14 must have a label indicating it meets the flammability standard.

_____ 16. Commercial laundering is the best way to keep flame resistant fabrics in good condition.

_____ 17. It is important to follow care labels carefully when laundering flame resistant fabrics. There are many different directions for laundering depending on the chemical composition of the fabric and the flame resistant material.

_____ 18. The warning "Do not use soap" means the same thing as "Do not use detergents."

_____ 19. Hot water is the best for laundering flame resistant fabrics.

_____ 20. When choosing garments not made of flame resistant material, remember that a tightly woven, heavy fabric burns more slowly than a sheer, lightweight, loosely woven fabric.

_____ 21. Cotton terry cloth burns only with great difficulty.

_____ 22. A robe with tapered close-fitting sleeves, no ruffles or trim and no long ties at neck or waist, it the best choice for a housecoat to be worn around the kitchen.

ANSWERS

The answers and explanations are provided for your use in reviewing the materials with students:

False 1. The sparks or flame don't have to touch the liquid to start a fire. Flammable liquids, especially when they get warm, send off a vapor. This invisible vapor can travel across a room and be ignited by a spark or a cigarette many feet away.

True 2.

False 3. When clothing catches on fire the extent and depth of burns are more severe than skin burns on uncovered areas. A recent study by the National Burn Information Exchange showed that clothing burn victims were four times more likely to die than burn victims spared clothing fire. Their burns covered nearly twice as much body surface.

True 4.

True 5.

False 6. Federal flammability standards are not suggestions. They are law. Every item of children's sleepwear, mattresses and carpeting manufacured or imported into the U.S. must be able to pass the test for its particular standard.

False 7. After the effective date only products which meet the Federal flammability standard can be manufactured or imported into the country. To prevent great economic loss, businessmen are usually allowed to sell what remains in inventory in stores and warehouses. This means it is important for consumers and sales people to check labels to be sure goods meet standards.

False 8. Fabrics generally used in clothing, carpeting and upholstery are not flame proof. All will burn. Fabrics that meet the flammability stardards are flame resistant. They burn more slowly and resist the spread of flames better than ordinary fabrics.

False 9. All large carpets must be labeled with a "T" if flame retardant treatment has been added to the outside of the fiber. If the carpet is made of an inherently flame resistant fiber (modacrylic, for example) labeling is not required. Most manufacturers, however, will voluntarily label carpets to keep consumers informed. It is now law that all large carpets manufactured must meet the standard. The only non-complying large carpet that may be on the market is one manufactured before the standard took effect in 1971. Check for this when buying.

True 10. It must be permanently labeled, "Flammable (Fails U.S. Dept. of Commerce Standard FF2-70): Should not be used near sources of ignition."

True 11.

False 12. Children under 5 and the elderly are the most frequent and most severely injured fire victims.

True 13.

False 14. No label is required, but most manufacturers do label garments. All children's sleepwear 0-6x manufactured after July 29, 1973 must comply whether or not it is labeled. There is very little non-complying sleepwear left in inventories.

True 15. Because the standard is so recent (May 1975) it is necessary to have labeling to differentiate the new sleepwear that meets the standard from the large amount of non-complying sleepwear still on the market. Complying children's sleepwear, size 7-14, manufactured between May 1, 1975 and May 1, 1978 must have a label that reads, "Flame Resistant U.S. Standard FF-5-74."

False 16. The strong chemicals used in commercial laundries can cause loss of flame resistance.

True 17.

False 18. Soaps are different from detergents. Soaps leave a fat deposit which builds up on a fabric

and may result in loss of flame resistance and stiffen the fabric. It is important to read the label carefully and follow instructions.

False 19. Use warm water. Hot water causes shrinkage and severe wrinkling.

True 20.

False 21. Cotton terrycloth is fluffy, napped fabric with air spaces between the fibers which will ignite and burn rapidly. This, coupled with the fact that towels are often long, flowing, and have fringed edges, makes them inappropriate to use when moving pots on a range. Always use a potholder which was designed for this particular job.

True 22.

DISCUSS AND DO

Discuss the first part of each question in class, then follow up with the suggested activities. The purpose of Discuss and Do questions is to enable students to apply information about flammable fabrics to relevant situations in marketing and distribution.

1. What kinds of questions and complaints do you think sales people and buyers in infant's and children's wear departments might get about flammability and flame resistant sleepwear?
   - A. Develop and administer a questionnaire aimed at sales people and buyers in these departments. What kinds of questions and complaints do they most frequently get from customers? Do they feel they have the necessary information to handle the questions? What kinds of materials, if any, could the store or manufacturers provide to help with consumer problems?
   - B. Develop and administer a questionnaire aimed at consumers of infants' and children's wear. What do they think about flame resistant sleepwear? Do they have questions or complaints? What are the questions and complaints? Would they like to see flame resistant fabrics mandatory for all children's clothes, not just sleepwear? Why or why not?
   - C. Compare the attitudes of sales people and consumers. Do the sales people seem to be aware of consumer thoughts and attitudes? Do consumers seem satisfied with the information and advice they are getting from the store? Does there seem to be good communication between sales people and customer?

Develop this information into a report to the class. Perhaps local retailers would also be interested in the results of your research.

2. What kinds of materials or displays do you think would be appropriate for use in a store to educate consumers about selection of clothing for fire safety and care of flame resistant fabrics?
   - A. Design a program for in-store use.
3. In your own words describe the tests used in the mattress, carpet and children's sleepwear standards. Do you think setting and enforcing safety standards for flammability is an appropriate thing for the Federal Government to do? Why or why not? The Consumer Product Safety Commission is considering new flammability standards for all wearing apparel. Do you think this is a good idea? Why or why not?
   - A. There will be many different opinions on these questions in your class. Choose four people on each side and prepare a debate on the questions.
   - B. Beside the Federal laws, some states have additional flammability standards. For example, Michigan requires that all new camping tents sold in the State be flame resistant. Research your state laws to see what, if any, rules there are about fabric flammability.
4. What is the experience in your community with fires related to clothing or other fabrics?
   - A. Interview the Fire Chief or ask him to send a representative to talk to your class about fires involving flammable fabrics. Develop a list of questions to ask him.

ROLE PLAY

Have students role play the following situations before the class.

1. Customer and sales person — Customer seeking advice about buying a housecoat for his grandmother who is partially paralyzed.
2. Customer and sales person — Customer brings in a stiff, wrinkled pair of baby pajamas that she says has only been worn and washed twice.
3. Head of advertising agency and store manager — Discussing a campaign for Fire Safety Week on educating consumers about laws and care of flame resistant fabrics.

FOR STUDENTS AND TEACHER

FLAMMABLE FABRICS DEMONSTRATION

The purpose of this demonstration is to show graphically the flammability and reaction to flame of a variety of fabrics. This demonstration will make real to the viewer the impact of fire on fabric and should help students in advising customers on appropriate choice of garments and fabrics.

The demonstration can be done by the teacher assisted by one or two students, or by a group of students. Remember, as in any situation where fire is involved, use care and follow instructions carefully.

MATERIALS NEEDED

FOR EXPERIMENT

- 2 deep glass dishes to catch the burning material
- cigarette lighter (preferably with adjustable flame length)
- flat glass or metal pie plate to display ashes or burnt residue
- metal tongs to hold burning material
- a wide variety of swatches of material

The fabric swatches should include natural fibers (wool, cotton, linen, silk) synthetic fibers (acrylics, modacrylics, polyester) and blends of natural and synthetic. Also, include some upholstery fabrics and samples of flame resistant fabrics used in children's sleepwear. Make sure there is a variety of fabric weights, surface finishes (napped, such as terrycloth, and smooth, such as denim) and some pile fabrics (fake fur). The fabric pieces should be about 3 x 3 inches, so that the class will be able to clearly see the burning activity.

FOR SAFETY

- a large bowl or pitcher of water
- fire extinguisher

The demonstration should be done over a high lab table or a desk or table covered with a flame resistant material. Be sure there are no papers or debris in the area that could catch fire. Perhaps, for maximum safety, your class could borrow a science lab or demonstration room for the day of the experiment.

METHOD

Identify the fabric swatch for the class and describe its burning characteristics. Then, holding the fabric sample in the tongs, light its edge. Hold the sample above the glass dish so the class can observe the burning pattern. As the remains fall into the glass dish point out characteristics of the ash (wool smells like burning feathers or hair) and discuss the effects of fires involving this material on burn victims. Then transfer the ashes or residue to the pie plate and allow the class to inspect the material.

Points to discuss about each fabric swatch include:

1. How easily did it ignite?
2. Did the fire go out or stop spreading when the flame source (cigarette lighter) was removed?
3. How quickly did the fire spread?
4. Was there a tendency to burst into flames?
5. Did the material seem to melt and disappear or turn into ash?

Compare not only fabrics of different fiber types (wool vs. cotton) but also, different weights and weaves of the same fabric — for example, a light, loosely woven wool with a tightly woven, heavy wool fabric. Also compare a flame resistant fabric with a non-flame resistant fabric of the same fiber content (flame resistant cotton with an un-

treated cotton of approximately the same weight and weave). Be sure you know exactly what you are burning. A swatch that is 20% cotton and 80% polyester will burn differently than 100% polyester. You should also be aware that dyes and fabric finishes may somewhat alter the flammability and burning pattern of fabrics. They may also affect the shape and color of the residue. Generally, however, fabrics will burn true to form.

The following fact sheet and chart will give you the information you'll need about the flammability and burn characteristics of different kinds of fibers and fabrics. All of the listings on the chart are for untreated fabrics except for the last entry, which describes the characteristics of flame resistant treated cotton. You may want to make the chart into a transparency to show during or after the demonstration, or reproduce copies for class use.

After the demonstration discuss with the class the best fabrics to use for specific types and items of clothes – especially children's sleepwear and clothing for the elderly and handicapped – in light of what is shown in the demonstration.

SOME ADDITIONAL SUGGESTIONS

You may want to do this demonstration for other classes in your school – home economics, consumer education and science classes may well be interested.

Your DECA chapter may want to make this demonstration part of a project on flammable fabrics. The Chapter could do the demonstration for various parent and service organizations in the community, combining the demonstration with information on care and maintenance of flame resistant fabrics.

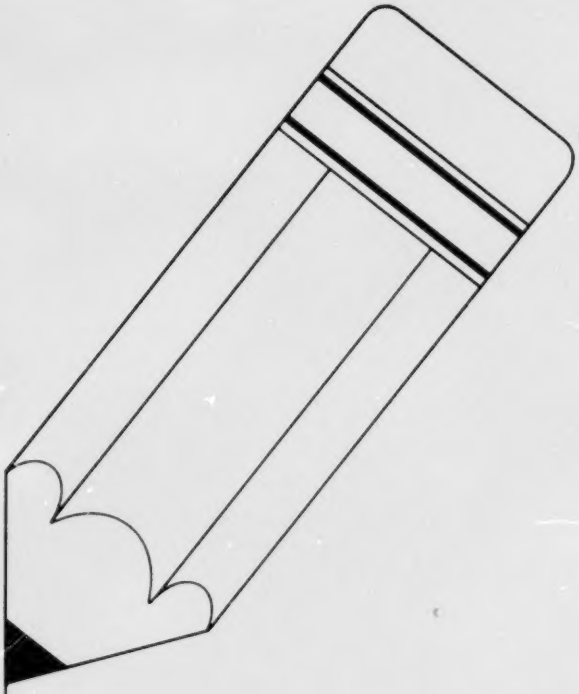
FACT SHEET

- Tightly woven, heavy fabrics burn more slowly than those which are sheer, lightweight or loosely woven. There are less air spaces to spread the flame.
- Napped fabrics (like terrycloth) burn more quickly than smooth-surfaced fabrics, and a fluffy pile burns faster than a close knit low pile. Again, there are more air spaces and, therefore, more oxygen to feed the fire.
- Many synthetics tend to melt rather than burst into flames.
- Burn injury patterns – Typically, fabrics made from untreated cotton and rayon ignite and spread the fire rapidly. This may result in large area burns on the victim. Fabrics made from synthetics, such as nylon and polyester, do not burn or spread the flame as rapidly. However, they tend to melt and stick to the skin often causing deep localized burns.

BURN CHARACTERISTICS OF SOME COMMON FIBERS

UNTREATED FIBERS

NATURAL FIBERS	APPROACHING FLAME	IN FLAME	REMOVED FROM FLAME	ODOR	RESIDUE	COMMENTS
Wool	curls and melts away from flame	burns slowly with slight sputtering effect	usually stops burning when removed from flame	burning hair or feathers	brittle, black bead	
Cotton	does not shrink away, ignites on contact	burns readily and quickly	continues burning, supports combustion, has afterglow	burning paper	small amount of fluffy gray ash	spreads fire rapidly, especially true of lightweight loosely woven cotton
Linen	does not shrink away, ignites on contact	burns readily and quickly	continues burning, supports combustion, has afterglow	burning paper	small amount of fluffy gray ash	spreads fire rapidly, especially true of lightweight loosely woven linen.
Silk	curls and melts away from flame	burns slowly and sputters	upon removal from flame will sputter and usually extinguishes itself	burning hair	crisp, brittle ash	
SYNTHETICS						
Rayon	ignites on contact, does not shrink away from flame	burns quickly, does not melt	supports combustion, continues to burn, afterglow	similar to burning paper	very small amount of light fluffy residue	
Acetate	melts and burns evenly, melts away from flame	melts and burns quickly	supports combustion, may continue to burn	acrid, smells like hot vinegar	irregular shaped, hard, black bead	
Nylon	melts away from flame	melts and burns, will burn if held in open flame, usually stops when flame removed	does not readily support combustion	white smoke, odor like cooking celery or green beans	gray or tan ash that hardens as it cools	
Polyester	fuses, melts and shrinks away from flame	burns slowly and continues to melt	usually self extinguishing, does not support combustion	chemical odor	dark smoke, tough black or brown bead	
Acrylics	burn upon exposure to flame	gives off hot yellow flame and forms gummy residue that drips away from the burning fiber	continues to burn and melt	acrid	residue drips away from flame, hot enough to ignite things on which it falls	
Modacrylics	fuses and melts from flame	burns slowly, if at all	self extinguishing	acrid, chemical odor	irregular black bead	inherently fire resistant material
FLAME RESISTANT TREATED FIBERS						
Cotton	does not shrink away, ignites on contact	chars or burns slowly	will not support combustion for any length of time, produces a great deal of smoke, no afterglow	chemical	structure of fabric still remains with charred area	



TEACHER'S NOTES

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